Teaching Natural Hazards at University level: Integration of ICT, and advanced and classic techniques in classroom and fieldwork.

Glòria Furdada, Marta Guinau

RISKNAT Research Group, Geomodels Institute. Dpt. Dinàmica de la Terra i de l’Oceà; Universitat de Barcelona

gloria.furdada@ub.edu; mguinau@ub.edu
We present our experience of learning by doing while integrating ICT, advanced and classic techniques in classroom and fieldwork, to teach Natural Hazards at University.

**Objective:**

- to learn to assess natural hazards based on the example of a particular mountain area
- to produce a group map and an individual report (learning by doing; Project Based Learning-PBL)

- The learning activities are structured around a mountain valley affected by floods and landslides.
- The working groups (4-5 students) focus on a specific stretch along the valley and adjacent slopes.
- We alternate classroom activities with field work, organized in 3 steps:
  1) Information compilation and preparation of the field work;
  2) field work (3 days); and
  3) GIS analysis: hazardous and exposed areas, + final synthesis.
<table>
<thead>
<tr>
<th>Time</th>
<th>WORK STEPS</th>
<th>SUPPORT</th>
<th>TASK FULFILMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>1) Information compilation and preparation of the field work:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>a) Information search: basic hazard information of the area: archives, administration and university databases</td>
<td>Class Dropbox</td>
<td>Individual</td>
</tr>
</tbody>
</table>
|      | b) classical stereoscopic photointerpretation:  
      |       |       |                 |
|      |   • to characterize the geoforms → recent photos  
      |       |       |                 |
|      |   • to study the reference flood occurred in 1982 → 1982 ancient aerial photos | Classical aerial stereoscopy | Individual |
|      |      |         |                 |
|      | **2) Field work (3 days):** |         |                 |
|      | c) Presentation of the preliminary observations | cell phone + PPT + Google Earth | Small group (4 students) |
|      | d) Map legends collective construction:  
      |       |       |                 |
|      |   hazard indicators legend | paper on the wall (as a whiteboard) | Entire class-group |
|      | e) Complementary information | effects of the 1982 flood video | Entire class-group |
|      | f) Queries | Class Dropbox | Individual → Small group |
|      | g) Classical stereoscopic photointerpretation (to complete data) | Classical aerial stereoscopy | Individual → Small group |
|      | h) Mapping of geoforms: as indicators of magnitude and degree of activity | paper (Din-A3) | Small group (4 students) |
|      |      |         |                 |
|      | **3) GIS analysis considering hazardous and exposed areas, and final synthesis:** |         |                 |
|      | i) GIS exercise: preliminary risk map | GIS software | Individual |
|      | j) Synthesis class | Blackboard + PPT | Entire class-group |
|      | k) Report: Natural hazards evaluation in the studied zone | Written report (paper + PDF) | Individual |
1) Information compilation and preparation of the field work:

a) Information search:

b) classical stereoscopic photointerpretation:

1982 post-flood

recent

class dropbox

archives

data bases

egu.furdada@ub.edu; mguinaubub.edu
2) field work (3 days):

c) Presentation of the preliminary observations:
   groups of 4 students (observations, cell phone photos, Google Earth images, ...)

d) Map legends collective construction:
   hazard indicators legend (white board)
e) Complementary information
f) Queries through internet: *class dropbox, databases, etc.*
  through books and reports

e) Classical stereoscopic photointerpretation (to complete data)
h) Mapping of geoforms: as indicators of magnitude and degree of activity
3) GIS analysis considering hazardous and exposed areas, and final synthesis:

i) GIS exercise: preliminary risk map

j) Synthesis class
k) Personal report: Natural hazards assessment in the studied zone
CONCLUSIONS

- Students integrate theoretical knowledge and practical work.

- Students develop group work skills and oral and written expression.

- Students develop the capacity to work with classical and ICT techniques and technology, and to integrate the results.

- Students experience in the field what indicators are needed to perform a good analysis of the magnitude and degree of activity of geological phenomena that can affect a mountain area.

- The knowledge acquired throughout information search and queries, photointerpretation, field work and GIS application is put into practice, in this case for the assessment of geological hazard.

- The work approach as a natural hazards assessment project in a subject of the last course especially motivates the students who feel close their incorporation in a real workplace.